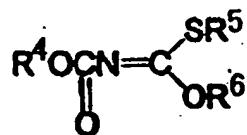


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a 2 9. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

General formula (2)



in which: R^4 represents a substituted or non-substituted alkyl group, or a substituted or non-substituted aryl group; R^5 represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group; and R^6 represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or a substituted or non-substituted aryl group, the method comprising the steps of:

adding a chloroformic acid derivative represented by the following general formula (7) to an isothiocyanic acid salt represented by the following general formula (5) and a hydroxy derivative represented by the following general formula (6) for preparing an intermediate represented by the following general formula (8); and

preparing the isothiocyanatoformic acid ester derivative from the intermediate:

ZNCS

General formula (5)

R^6OH

General formula (6)

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contd.
a 2



General formula (7)

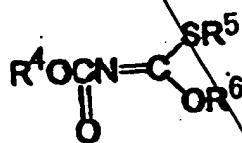


General formula (8)

wherein, in the general formula (5), Z represents a sodium atom or a potassium atom.

10. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

General formula (2)



Sub b1
in which: R^4 represents a substituted or non-substituted alkyl group, or a substituted or non-substituted aryl group; R^5 represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group; and R^6 represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or a substituted or non-substituted aryl group, the method comprising the steps of:

preparing a first intermediate represented by the following general formula (8);

preparing a second intermediate represented by the following general formula (10) from the first intermediate and a compound represented by the following general formula (9); and

preparing the isothiocyanatoformic acid ester derivative from the second intermediate:

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contd.
a²

b¹

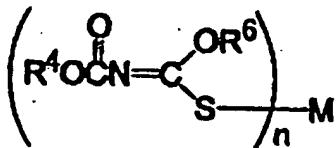
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General formula (8)



General formula (9)

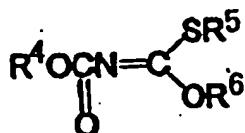


General formula (10)

wherein, in the general formulas (9) and (10), M represents an alkali metal atom, an alkali earth metal atom, an aluminum atom or a magnesium atom.

11. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

General formula (2)



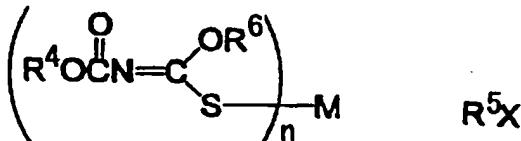
in which: R⁴ represents a substituted or non-substituted alkyl group, or a substituted or non-substituted aryl group; R⁵ represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group;

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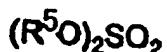
contd.
a2

and R^6 represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or a substituted or non-substituted aryl group, the method comprising the steps of:

preparing an intermediate represented by the following general formula (10); and reacting the intermediate with an alkylating agent represented by one of the following general formula (11) and the following general formula (12) for preparing the isothiocyanatoformic acid ester derivative:



General formula (10) General formula (11)



General formula (12)

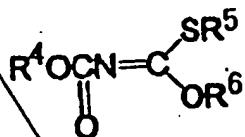
wherein, in the general formula (10), M represents an alkali metal atom, an alkali earth metal atom, an aluminum atom or a magnesium atom, and, in the general formula (11), X represents a halogen atom or SO_3Ar , and Ar represents a substituted or non-substituted aryl group.

12. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

5b
b1

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General formula (2)



in which: R⁴ represents a substituted or non-substituted alkyl group, or a substituted or

non-substituted aryl group; R^5 represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group; and R^6 represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or a substituted or non-substituted aryl group, the method comprising the steps of:

adding a chloroformic acid derivative represented by the following general formula (7) to an isothiocyanic acid salt represented by the following general formula (5) and a hydroxy derivative represented by the following general formula (6) for preparing a first intermediate represented by the following general formula (8);

preparing a second intermediate represented by the following general formula (10) from the first intermediate and a compound represented by the following general formula (9); and

preparing the isothiocyanatoformic acid ester derivative from the second intermediate:

ZNCS

General formula (5)

$$R^6OH$$

General formula (6)

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contd.
a 2
Sub
β 1



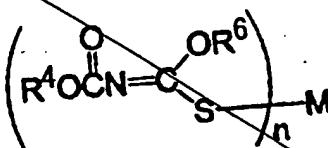
General formula (7)



General formula (8)



General formula (9)

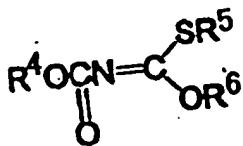


General formula (10)

wherein, in the general formula (5), Z represents a sodium atom or a potassium atom, and, in the general formulas (9) and (10), M represents an alkali metal atom, an alkali earth metal atom, an aluminum atom or a magnesium atom.

13. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

General formula (2)



in which: R⁴ represents a substituted or non-substituted alkyl group, or a substituted or non-substituted aryl group; R⁵ represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group;

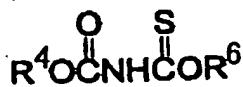
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contd. and R⁶ represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or
a² a substituted or non-substituted aryl group, the method comprising the steps of:

preparing a first intermediate represented by the following general formula (8);

preparing a second intermediate represented by the following general formula (10) from
the first intermediate and a compound represented by the following general formula (9); and

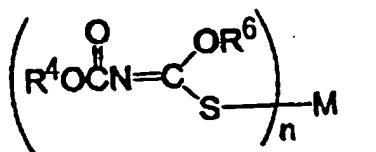
reacting the second intermediate with an alkylating agent represented by one of the
following general formula (11) and the following general formula (12) for preparing the
isothiocyanatoformic acid ester derivative:



General formula (8)



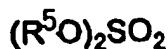
General formula (9)



General formula (10)



General formula (11)



General formula (12)

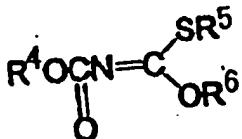
wherein, in the general formulas (9) and (10), M represents an alkali metal atom, an alkali
earth metal atom, an aluminum atom or a magnesium atom, and, in the general formula (11), X

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contd.
a²
represents a halogen atom or SO_3Ar , and Ar represents a substituted or non-substituted aryl group.

14. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

General formula (2)



in which: R^4 represents a substituted or non-substituted alkyl group, or a substituted or non-substituted aryl group; R^5 represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group; and R^6 represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or a substituted or non-substituted aryl group, the method comprising the steps of:

adding a chloroformic acid derivative represented by the following general formula (7) to an isothiocyanic acid salt represented by the following general formula (5) and a hydroxy derivative represented by the following general formula (6) for preparing a first intermediate represented by the following general formula (8);

preparing a second intermediate represented by the following general formula (10) from the first intermediate; and

reacting the second intermediate with an alkylating agent represented by one of the following general formula (11) and the following general formula (12) for preparing the isothiocyanatoformic acid ester derivative:

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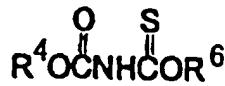
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a 2

ZNCS

R^6OH

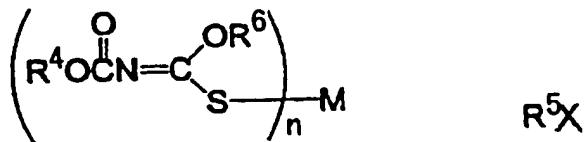
General formula (5)

General formula (6)

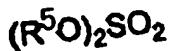


General formula (7)

General formula (8)



General formula (10) General formula (11)



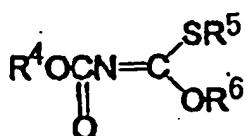
General formula (12)

wherein, in the general formula (5), Z represents a sodium atom or a potassium atom, in the general formula (10), M represents an alkali metal atom, an alkali earth metal atom, an aluminum atom or a magnesium atom, and, in the general formula (11), X represents a halogen atom or SO_3Ar , and Ar represents a substituted or non-substituted aryl group.

15. (Amended) A method of preparing an isothiocyanatoformic acid ester derivative represented by the following general formula (2):

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contd.
a² General formula (2)



in which: R⁴ represents a substituted or non-substituted alkyl group, or a substituted or non-substituted aryl group; R⁵ represents a substituted or non-substituted alkyl group, a substituted or non-substituted aryl group, or a substituted or non-substituted heterocyclic group; and R⁶ represents a substituted or non-substituted alkyl group having at least 3 carbon atoms, or a substituted or non-substituted aryl group, the method comprising the steps of:

adding a chloroformic acid derivative represented by the following general formula (7) to an isothiocyanic acid salt represented by the following general formula (5) and a hydroxy derivative represented by the following general formula (6) for preparing a first intermediate represented by the following general formula (8);

preparing a second intermediate represented by the following general formula (10) from the first intermediate and a compound represented by the following general formula (9); and

reacting the second intermediate with an alkylating agent represented by one of the following general formula (11) and the following general formula (12) for preparing the isothiocyanatoformic acid ester derivative:

ZNCS

General formula (5)

R⁶OH

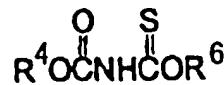
General formula (6)

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contd.
a²



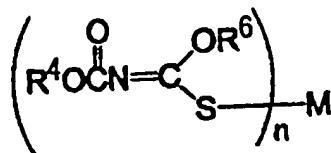
General formula (7)



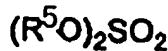
General formula (8)



General formula (9)



General formula (10)



General formula (11) General formula (12)

wherein, in the general formula (5), Z represents a sodium atom or a potassium atom, in the general formulas (9) and (10), M represents an alkali metal atom, an alkali earth metal atom, an aluminum atom or a magnesium atom, and, in the general formula (11), X represents a halogen atom or SO_3Ar , and Ar represents a substituted or non-substituted aryl group.